



United States  
Environmental Protection  
Agency

EPA530-R-07-001  
April 2007

## **National Priority Chemicals Trends Report (2000-2004)**

### **Section 4**

### **Chemical Specific Trends Analyses for Priority Chemicals (2000–2004): Hexachlorobenzene (HCB)**

Hazardous Waste Minimization and Management Division  
Office of Solid Waste  
U.S. Environmental Protection Agency

#### **Contact Information:**

Bill Kline, Senior Data Analyst  
Analysis & Information Branch  
(540) 341-3631  
[kline.bill@epa.gov](mailto:kline.bill@epa.gov)

Tammie Owen, Data Analyst  
Analysis & Information Branch  
(703) 308-4044  
[owen.tammie@epa.gov](mailto:owen.tammie@epa.gov)

Ben Lesser, Chief  
Analysis & Information Branch  
(703) 308-0314  
[lesser.ben@epa.gov](mailto:lesser.ben@epa.gov)

## Hexachlorobenzene (HCB)

### Chemical Information:

HCB is a white crystalline solid created by the chlorination of benzene. A number of manufacturing processes for chlorinated organic compounds generate HCB as a byproduct or impurity. During the manufacture of chlorinated organic chemicals, HCB can be formed by thermal chlorination, oxychlorination, and pyrolysis when carbon and chlorine react at high temperatures. HCB is usually found in the still bottoms generated during product purification or distillation and in air emissions from distillation columns. HCB may also be found as an impurity in commercial chlorinated solvent products.

**CAS Number** – 118–74–1

**Alternate Names** – pentachlorophenyl chloride, perchlorobenzene

**General Uses** – HCB is also a potential byproduct formed during the production of metallic magnesium when it is produced via electrolysis with carbon electrodes. The degassing of molten aluminum with hexachloroethylene at aluminum foundries and secondary aluminum smelting plants also produces HCB. Gaseous emissions from hexachloroethylene-based aluminum degassing contain high yields of complex organochlorine compounds, including HCB. HCB was once used as an agricultural fungicide, but health concerns about its toxicity led to the cancellation of the registrations of all pesticides that contained HCB as an active ingredient. Its primary use was to treat wheat seeds, onions, and sorghum. As late as 1985 it was used to prevent wheat smut. Although no longer used as an active ingredient in pesticides, HCB is a byproduct impurity contained in a number of pesticides. However, using and intentionally making HCB is no longer allowed in the United States.

**Potential Hazards** – HCB is an irritant of the skin, eyes, mucous membranes, and upper respiratory tract. It emits toxic fumes of chlorides, carbon monoxide, and carbon dioxide when heated to decomposition. HCB is potentially toxic to the liver and a probable human carcinogen (EPA Integrated Risk Information System –IRIS).

### Summary Analysis:

- **NATIONAL:** In 2004, 35 facilities reported approximately 6.5 million pounds of HCB. In 2004, the quantity of HCB increased by 2.2 million pounds (+52 %). Most of this increase was reported by one facility, located in Louisiana.
- **REGIONS/STATES:** Since 2000, facilities in Region 6 have reported most of the HCB, including approximately 98 percent of the total quantity in 2004; facilities in three states (Louisiana, Texas, and Tennessee) accounted for more than 99 percent of the total quantity.
- **FACILITIES:** Of the 35 facilities that reported HCB in 2004, five facilities reported 99 percent of the total quantity of this chemical. One facility reported 75 percent of the total quantity.
- **MANAGEMENT:** Since 2000, treatment (using incineration) has been the primary management method and was used to manage approximately 95 percent of the total quantity of HCB in 2004.
- **INDUSTRY SECTOR:** Facilities in SIC 2869 (Industrial organic chemicals, nec) reported approximately 88 percent of the total quantity of HCB in 2004.

## National Trends:

Exhibit 4.106 shows the number of facilities that reported HCB from 2000 to 2004 and the quantities of this PC that were managed via disposal, treatment, energy recovery, and recycling. In 2004, approximately 6.5 million pounds of HCB were reported by 35 facilities. Compared to the quantity reported in 2000, there was approximately a 9 percent increase in 2004. The quantity of HCB had been reduced to approximately 4.2 million pounds in 2002–2003, but increased by 2.2 million pounds (+52 percent) in 2004. Most of this increase was reported by one facility, located in Louisiana, which attributed its increased quantity to improved flow measurement equipment.

Since 2000, treatment (using incineration) has been the primary management method and was used to manage approximately 95 percent of the total quantity of HCB in 2004. Recycling of HCB has increased significantly compared to the quantity recycled in 2000; approximately 1 million pounds of HCB were recycled in 2004.

**Exhibit 4.106. National Management Methods for Hexachlorobenzene, 2000–2004**

Management Methods for HCB and Number of Facilities	2000	2001	2002	2003	2004	Percent Change (2000–2004)	Management Method – Percent of Quantity of This PC in 2004
Number of Facilities	43	40	36	36	35	–18.6%	-
Disposal Quantity (pounds)	13,025	13,992	6,247	14,395	16,946	30.1%	0.3%
Energy Recovery Quantity (pounds)	167,073	350,900	201,616	301,990	332,723	99.1%	5.1%
Treatment Quantity (pounds)	5,754,663	5,400,490	4,000,842	3,954,274	6,135,821	6.6%	94.6%
Priority Chemical Quantity (pounds)	5,934,761	5,765,382	4,208,705	4,270,659	6,485,490	9.3%	-
Recycling Quantity (pounds)*	17,139	6,310	740,144	399,607	1,004,270	5759.6%	-
*Note: Waste minimization is the emphasis of this Report. As such, we primarily focus on quantities of PCs that are managed via onsite/offsite disposal, treatment, or energy recovery because we believe these PC quantities offer the greatest opportunities for waste minimization. Because recycled quantities of PCs are already directed to their best uses, they are considered separate and distinct from the quantities of PCs not recycled. Throughout this section, the recycled quantity is presented to provide some perspective regarding the quantity of this PC already recycled compared to the quantities that are managed via disposal, treatment, and energy recovery and thus potentially available for waste minimization.							

Exhibit 4.107 shows the number of facilities that reported HCB within various quantity ranges. Of the 35 facilities that reported HCB in 2004, five facilities reported 99 percent of the total quantity of this chemical. One facility reported 75 percent of the total quantity.

**Exhibit 4.107. Distribution of Quantities by Facilities Reporting Hexachlorobenzene, 2004**

HCB (6,485,490 pounds)		
Quantity Reported	Number of Facilities Reporting This Quantity (2004)	Percent of Total Quantity of This PC (2004)
up to 10 pounds	9	less than 0.1%
11 – 100 pounds	7	less than 0.1%
101 – 1,000 pounds	5	less than 0.1%
1,001 – 10,000 pounds	6	0.3%
10,001 – 100,000 pounds	3	0.9%
100,001 – 1 million pounds	4	23.7%
> 1 million pounds	1	75.1%

## EPA Regional Trends:

Exhibits 4.108 and 4.109 show the quantity of HCB, by EPA region, where facilities reported this PC in 2000–2004. Since 2000, facilities in Region 6 have reported most of the HCB, including approximately 98 percent of the total quantity in 2004. In 2004, Region 6 facilities reported an increase of approximately 2.1 million pounds; most of this increase was reported by one facility, located in Louisiana, which attributed the increased quantity to improved flow measurement equipment. A facility in Tennessee also reported a large increase in 2004 that accounted for most of the increase in Region 4.

**Exhibit 4.108. Regional Quantity of Hexachlorobenzene, 2000–2004**

<b>EPA Region</b>	<b>2000 (pounds)</b>	<b>2001 (pounds)</b>	<b>2002 (pounds)</b>	<b>2003 (pounds)</b>	<b>2004 (pounds)</b>	<b>Percent Change in Quantity (2000–2004)</b>	<b>Percent of Total Quantity of This PC (2004)</b>
1	6	0	0	0	0	–100.0%	0.0%
2	3,233	2,966	3,146	3,492	3,521	8.9%	0.1%
3	0	19	0	83	140	NA	0.0%
4	120,556	5,981	1,926	11,642	124,996	3.7%	1.9%
5	54	35	49	53	14	–73.6%	0.0%
6	5,752,002	5,751,120	4,198,112	4,250,889	6,351,393	10.4%	97.9%
7	31	78	53	29	76	146.5%	0.0%
8	213	623	360	46	65	–69.5%	0.0%
9	58,665	4,560	5,059	4,424	5,285	–91.0%	0.1%
10	0	0	0	0	0	–45.0%	0.0%
<b>Total</b>	<b>5,934,761</b>	<b>5,765,382</b>	<b>4,208,705</b>	<b>4,270,659</b>	<b>6,485,490</b>	<b>9.3%</b>	<b>100.0%</b>

**Exhibit 4.109. Distribution of Facilities Reporting Hexachlorobenzene in 2004 and the Quantities of Hexachlorobenzene Reported in 2004, by EPA Region**

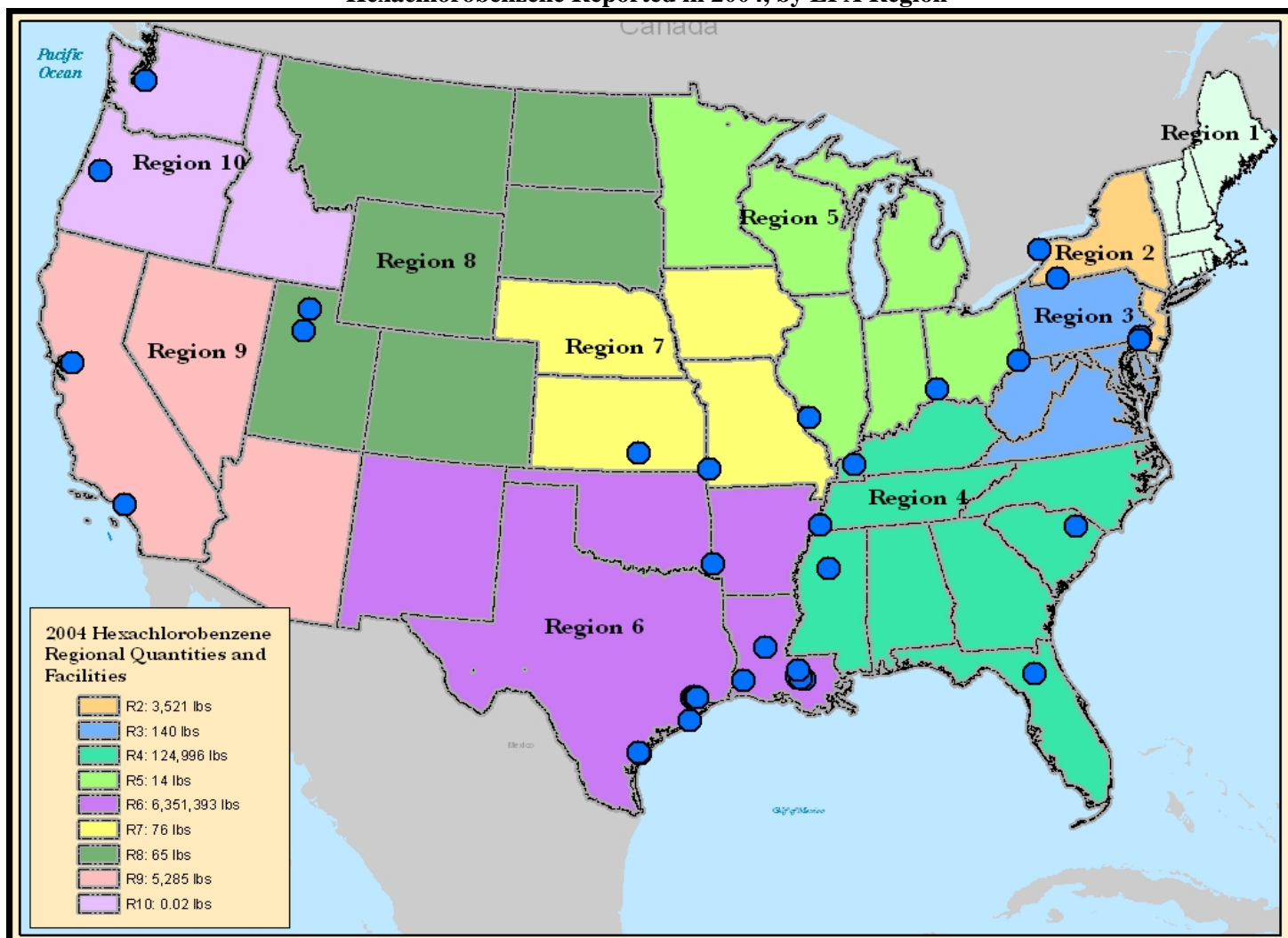


Exhibit 4.110 shows the management of HCB by the facilities in each of the two EPA regions that reported 99 percent of this chemical in 2004. In 2004, these facilities treated approximately 95 percent of the HCB, mostly onsite. Facilities in Region 6 also used onsite energy recovery for approximately 5 percent of the HCB. Less than 1 percent of the HCB was sent to land disposal. One facility in Region 6 reported approximately 99 percent of the total quantity that was recycled in 2004.

**Exhibit 4.110. Regional Management Methods for Facilities Reporting 99 Percent of Hexachlorobenzene, 2004**

EPA Region	Quantity (pounds) of HCB (2004)	Percent of HCB (2004)	Disposal		Energy Recovery		Treatment		Recycling	
			Onsite Disposal (pounds)	Offsite Disposal (pounds)	Onsite Energy Recovery (pounds)	Offsite Energy Recovery (pounds)	Onsite Treatment (pounds)	Offsite Treatment (pounds)	Onsite Recycling (pounds)	Offsite Recycling (pounds)
6	6,351,393	97.9%	662	12,369	330,606	0	5,982,779	24,977	995,799	0
4	124,996	1.9%	0	3,802	0	1	119,171	2,022	2,900	0

## State Trends:

In 2004, although facilities in 19 states reported HCB, facilities in only three of these states (Louisiana, Texas, and Tennessee) accounted for over 99 percent of the total quantity of HCB. Exhibits 4.111 and 4.112 show the quantity of HCB, between 2000 and 2004, that was reported by facilities in these three states.

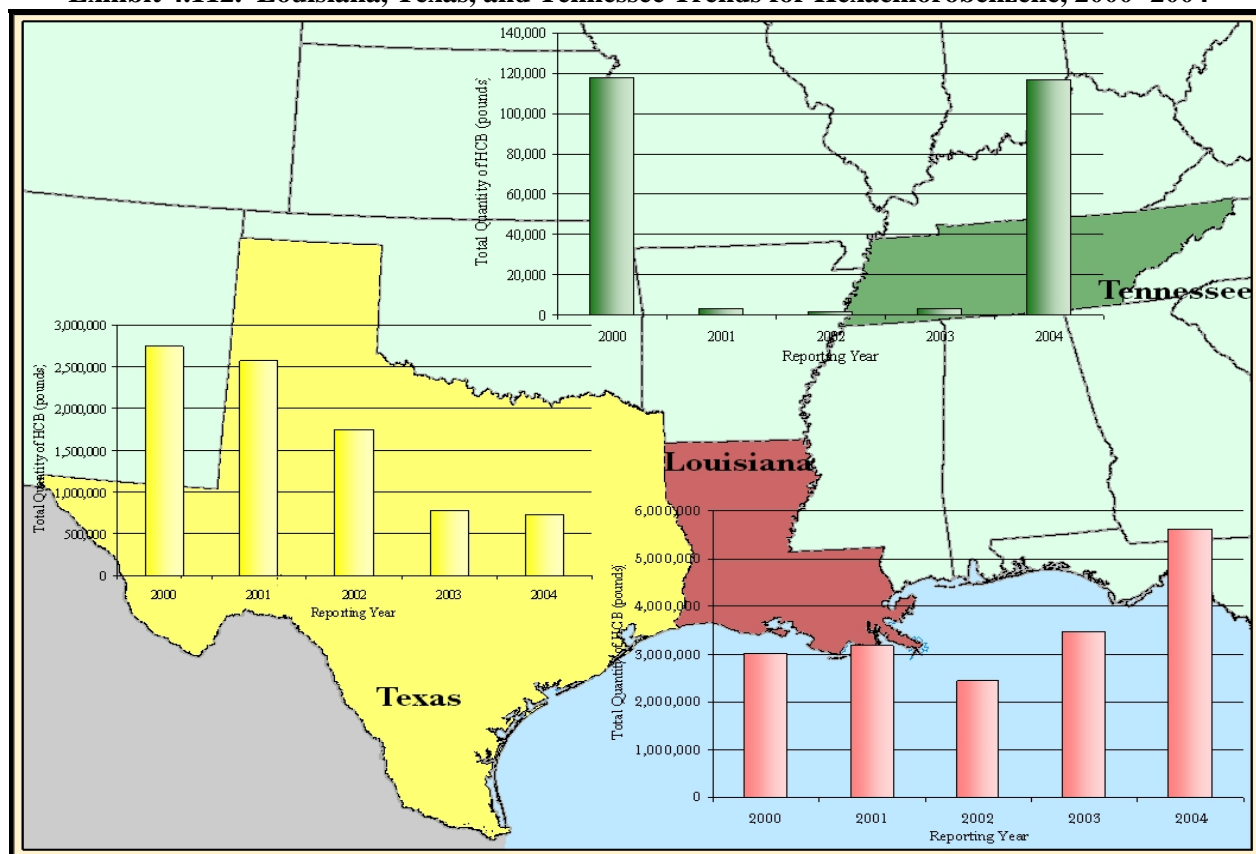
Some trend highlights are:

- Since 2000, facilities in Louisiana accounted for most of the HCB, including approximately 87 percent of the total quantity of this chemical in 2004. In 2004, Louisiana facilities reported approximately 2.1 million more pounds of HCB than they reported in 2003. Most of this increase was reported by one facility, located in Louisiana, which attributed much of the increased quantity to improved flow measurement equipment.
- Since 2000, facilities in Texas have reported a steadily decreasing quantity of HCB – a difference of approximately 2 million pounds. One facility accounted for most of the quantity reported in 2004.
- In Tennessee, one facility accounts for most of the HCB. Although this facility reported relatively lower quantities in 2001–2003, its 2004 quantity increased significantly and was comparable to the quantity reported in 2000.

**Exhibit 4.111. State Quantity Trends for Facilities Reporting 99 Percent of Hexachlorobenzene, 2000–2004**

State	Total Quantity (pounds) of HCB					Change in Quantity (2000–2004)	Percent Change in Quantity (2000–2004)	Percent of Total Quantity of This PC (2004)
	2000	2001	2002	2003	2004			
LA	3,001,834	3,180,684	2,445,788	3,478,265	5,616,058	2,614,224	87.1%	86.6%
TX	2,750,168	2,570,436	1,752,324	772,624	735,335	–2,014,834	–73.3%	11.3%
TN	117,980	3,163	1,765	2,988	116,522	–1,458	–1.2%	1.8%

**Exhibit 4.112. Louisiana, Texas, and Tennessee Trends for Hexachlorobenzene, 2000–2004**



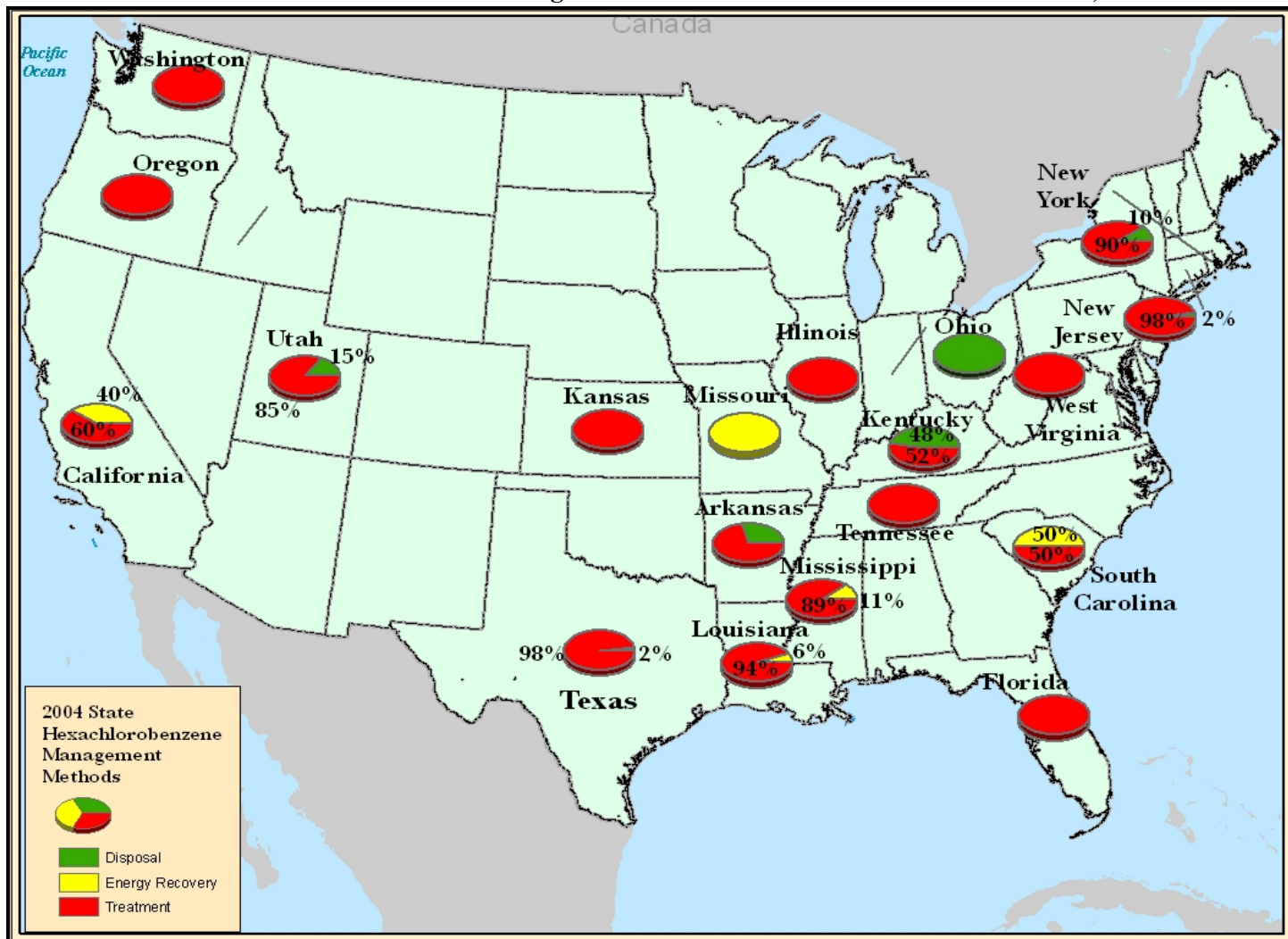
Exhibits 4.113 and 4.114 show how HCB was managed by facilities in the three states (Louisiana, Texas, and Tennessee) that accounted for over 99 percent of the total quantity of HCB in 2004. Most (approximately 95 percent) of the HCB reported by facilities in all three of these states was treated, primarily onsite. A facility in Louisiana also used energy recovery for approximately half of its HCB. One facility in Texas reported approximately 99 percent of the total quantity of HCB that was recycled in 2004.

**Exhibit 4.113. Management Methods for Hexachlorobenzene, Facilities in States With 99 Percent of Total Quantity, 2004**

State	Total Quantity (pounds) of HCB (2004)	Onsite Disposal (pounds)	Offsite Disposal (pounds)	Onsite Energy Recovery (pounds)	Offsite Energy Recovery (pounds)	Onsite Treatment (pounds)	Offsite Treatment (pounds)	Onsite Recycling (pounds)	Offsite Recycling (pounds)
LA	5,616,058	9	2	329,840	0	5,285,363	843	0	0
TX	735,335	652	12,367	766	0	697,416	24,133	995,799	0
TN	116,522	0	0	0	0	114,971	1,551	0	0



**Exhibit 4.114. Distribution of Management Methods of Hexachlorobenzene in States, 2004**



### Industry Sector (SIC) Trends:

Exhibit 4.115 shows the quantity of HCB for the two industry sectors (SIC codes) in which facilities reported over 99 percent of this chemical in 2004. Facilities in SIC 2869 (Industrial organic chemicals, nec) reported the highest quantities, accounting for approximately 88 percent of the total quantity of HCB in 2004. Since 2002, the quantity of HCB reported by SIC 2869 facilities has increased significantly each year, including an increase of approximately 3 million pounds in 2004. One Louisiana facility reported approximately 85 percent of the total quantity for this industry sector and accounted for approximately 2.3 million pounds of the overall increase in 2004 – attributing much of its increased quantity to improved flow measurement equipment. This same facility had reported SIC 2812 as its primary SIC code in 2000 and 2001 prior to reporting SIC 2869 as its primary SIC code since 2002, resulting in the decreased quantities for SIC 2812 beginning in 2002.



**Exhibit 4.115. Industry Sectors Containing Hexachlorobenzene, 2000–2004**

Primary SIC	SIC Description	Number of Facilities That Reported HCB (2004)	2000 (pounds)	2001 (pounds)	2002 (pounds)	2003 (pounds)	2004 (pounds)	Change in Quantity (2000–2004)	Percent of Total Quantity of This PC (2004)
2869	Industrial organic chemicals, nec	10	222,500	51,414	1,960,603	2,620,397	5,714,909	5,492,409	88.2%
2812	Alkalies and chlorine	5	5,620,951	5,660,497	2,215,976	903,456	742,935	–4,878,016	11.5%
<b>Total</b>		<b>15</b>	<b>5,843,451</b>	<b>5,711,911</b>	<b>4,176,580</b>	<b>3,523,853</b>	<b>6,457,844</b>	<b>614,393</b>	<b>99.6%</b>

Exhibit 4.116 shows how HCB was managed by the 15 facilities in these two industry sectors in 2004. Some observations are:

- Almost 100 percent of the HCB reported by facilities in SIC 2869 (Industrial organic chemicals, nec) was treated, primarily onsite.
- Facilities in SIC 2812 (Alkalies and chlorine) treated approximately 56 percent of their HCB and used onsite energy recovery for the remaining 44 percent of this chemical.
- Only a relatively small quantity of HCB was land disposed.
- One SIC 2869 facility, located in Texas, reported over 99 percent of the recycled HCB in 2004.

**Exhibit 4.116. Management Methods for Hexachlorobenzene in Industry Sectors With 99 Percent of Total Quantity, 2004**

Primary SIC	SIC Description	Total Quantity (pounds) of HCB (2004)	Percent of Total Quantity (2004)	Disposal (pounds)		Energy Recovery (pounds)		Treatment (pounds)		Recycling (pounds)	
				Onsite Disposal	Offsite Disposal	Onsite Energy Recovery	Offsite Energy Recovery	Onsite Treatment	Offsite Treatment	Onsite Recycling	Offsite Recycling
2869	Industrial organic chemicals, nec	5,714,909	88.1%	662	3,811	0	0	5,686,654	23,782	998,699	0
2812	Alkalies and chlorine	742,935	11.5%	0	1	329,840	0	411,855	1,238	0	0